FILE COPY FOREST INSECT LABORATORY, UNIVERSITY OF CALIFORNIA, BERKELEY, CALIFORNIA

C 35.1

UNITED STATES DEPARTMENT OF AGRICULTURE

BUREAU OF ENTOMOLOGY AND PLANT QUARANTINE

Project | Date | Author

TITLE

FOREST INSECT SURVEY - INYO AND MONO NATIONAL FORESTS

Season of 1939

JHM
MLL
KAS
JEP
GRS
HLM
ASW
JWB
CDE
RCH
JSY
STC
PCJ
ESS

by
J. E. Patterson
Berkeley, California
December 14, 1939

U. S. GOVERNMENT PRINTING OFFICE 8—9742

SUBJECT—

INDEX NO.—

Forest Insect Laboratory
Berkeley, California
December 14, 1939

FOREST INSECT SURVEY -- INYO AND MONO NATIONAL FORESTS

Season of 1939

APPROVED BY:

Senior Entomologist, In Charge

SUBMITTED BY:

J. E. Patterson

Associate Entomologist

FOREST INSECT SURVEY - INYO AND MONO NATIONAL FORESTS

Season of 1939

During the 1939 field season two surveys of forest and range insect infestations on the Inyo and Mono National Forests were made by Associate Entomologist Patterson and Assistant Entomologist Yuill of the Forest Insect Laboratory, Berkeley, California. The first of these surveys was made July 19-26, and the second was made during the period October 14-20, 1939. Assistance in a part of the field work was given by Supervisor Boothe, Assistant Supervisor Simpson, and District Ranger Robinson, all of the Inyo Forest.

METHOD OF SURVEY

A general reconnaissance was made of all timbered areas, exclusive of the White Mountains district of the Inyo and the Sweetwater Mountains and Wellington Hills sections of the Mono. This reconnaissance was extended to include certain open ranges of both forests where forage damaging insects were active. The reconnaissance was supplemented by intensive examination of special areas and by plot cruises where detailed data were desired.

GENERAL INFESTATION CONDITIONS

Insect conditions in the coniferous forests are generally favorable. A sharp decline from the status of previous years has occurred in barkbeetle infestations throughout the Jeffrey pine and lodgepole pine forests. Conditions in the broadleaf species are about the same as formerly. A similar decline also occurred in the pinon or nut pine stands. However, range damage caused by the Great Basin Tent Caterpillar has increased on many areas where its preferred host (Bitterbrush) is the principal forage species. In general, endemic conditions prevail in the coniferous forests while epidemic infestations are imminent in the range districts.

BARKBEETLE INFESTATIONS IN JEFFREY PINE

Current insect losses in the Jeffrey pine stands are at the lowest point recorded during the fifteen year period these forests have been surveyed. The 1939 loss will not average more than five trees per section throughout the entire region. Plot loss data show even fewer trees than this average. The infestation is generally distributed with somewhat greater intensity along Walker River south of Coleville where high water recently exposed the root

system of many trees along this stream, resulting in greater tree susceptibility and consequent attacks. The Jeffrey pine beetle, Dendroctonus jeffreyi, remains the primary insect in these infestations although many trees show the presence as well of flathead borers, Melanophila spp. Current losses are largely confined to large mature trees.

A tabulation of losses during the year 1937 - 1938, with partial 1939 losses, on the four survey plots previously set up are shown in the following table. Location of these plots is shown on the maps in appendix.

Measured Plot Losses 1937 - 1938 - 1939

Plot	Ac.	Species	1937			1938			1939*		
			No. Trees	Vol. BM	BM/ac.	No. Trees	Vol. BM	BM/ac.	No. Trees	Vol. BM	BM/ac.
Mammoth	430	J.P.	12	24,020	56	14	36,310	85	1	1,640	4
Mono Craters	260	J.P.	8	10,580	40	3	8,060	31	1	2,570	10
Hell Gate	80	J.P.	0	0		1	1,950	24	0	0	
Leavitt Meadows	60	J.P.	0	0		0	0		0	0	

* Partial loss only—complete loss cannot be determined until June, 1940

BARKBEETLE INFESTATIONS IN LODGEPOLE PINE

The mountain pine beetle, Dendroctonus monticolae, is present in very limited numbers wherever lodgepole pine occurs in the region. However, during the past year it has played a very minor role and losses due to its activity have been negligible. The local infestation which had persisted for several years at the Mammoth Lakes was practically eliminated by control work carried out last spring. Reinfestation following this work was limited in amount to two partially infested trees. The endemic infestation on the headwaters of Glass Creek, which likewise persisted for several years, largely disappeared during the year. The local infestation in the Cowtrack Mountain area is still in an endemic state and has shown no tendencies toward increasing.

NEEDLEMINER INFESTATIONS IN LODGEPOLE PINE

The lodgepole pine needleminer, Recurvaria sp., has reappeared in the lodgepole pine stands at Sagehen and Crooked Meadows. This infestation is aggressive and is rapidly spreading. A t the end of the active season it had covered an area of about 11,000 acres. (See "D" on map in appendix). Defoliation during the season has been severe indicating an infestation of epidemic character.

TUSSOCK MOTH INFESTATIONS IN WHITE FIR

The highly epidemic infestation of Oslar's tussock moth, Hemerocampa oslari, which defoliated large areas of white fir extending from the Mammoth Lakes to Dunderburg Peak (areas "A" on maps) during its course, subsided in 1937 and has not since reappeared. However, defoliated trees continue to die as a direct result of defoliation and also from attacks by Scolytus and Tetropium; secondary insects which have invaded the weakened stands. The check plot which was set up in the Mammoth area in 1938 to study tree mortality resulting from an epidemic infestation was again examined and marked. A tabulation of the resultant data shows that a total of 34 defoliated trees died in 1938, the first year following subsidence of the epidemic, and a total of 18 trees died in 1939, the second year. Of the total dying in 1939, 11, or 7% died as a direct result of defoliation, and 7 trees, or 4%, died from defoliation plus attacks by secondary insects. Applying these plot losses to the acreage of all the epidemic centers in both forests results in the staggering total of 158,400 dead trees for the two year period on the total area of 15,000 acres. However, it is now evident that the peak of the loss has been reached and mortality should sharply decline with recovery from defoliation injury.

NEEDLEMINER INFESTATIONS IN PINON PINE

The highly epidemic infestation of the Pinon pine needleminer, Recurvaria n sp. reported last year in the Casa Diablo Mountain area has apparently run its ocurse and is now subsiding. The location of this area is shown in "C" on maps in appendix. The 1938 brood of caterpillars appeared to be normal but the usual mass flight of adults which occurred in July was greatly diminished in numbers. As a consequence very few eggs were laid. The cause of this excessive mortality was not definitely determined but the high ratio of parasitized larvae found during the early flight period may account for it.

During the period of epidemic infestations a total area of 9,000 acres was defoliated. Approximately 80% of defoliated trees have died on areas where severe defoliations were annually repeated for 4 to 8 years. The eastern section of the area is now a ghost forest with other areas rapidly approaching this status. With the subsidence of the infestation lightly defoliated trees should recover.

LEAF ROLLER ON QUAKING ASPEN

The Aspen Leaf Roller, Archips sp., which has defoliated quaking aspen on several recreational areas of both forests was given special attention during the surveys. This insect has caused damage on the intensive use areas in the Reversed Creek recreational region, in lower Leevining Canyon, and at Twin Lakes in the Bridgeport region. Areas "E" on maps in appendix. Characteristic damage consists of partial defoliation and dead twigs accompanied by sparse crowns causing lack of requisite shade on camp grounds. Wandering caterpillars migrating to fresh leaves fall into camps, becoming a general nuisance. Perhaps the greatest damage results in weakened tree resistance causing high susceptibility to fungus attacks. Entire groves of aspen have died on many campsites and summer home grounds as a result of this combination of injuries. No practical means of control have been developed for this species that are directly applicable to forest conditions. Individual trees can be protected and the nuisance of crawling caterpillars abated by spray applications during the feeding period.

TIP MOTH INFESTATIONS IN PINON PINE

Infestations of the pine tip moth, Rhyacionia neomexicana, have continued unabated in the nut pine stands between Topaz Lake and Gardnerville. This infestation first attracted attention in 1935 and has yearly increased in intensity and compass. The extent of the infested area in 1939 comprised about 20,000 acres of nut pine forest. (Area "F" on map in appendix). The caterpillars feed in the terminal and lateral shoots, mining out the interior of the tips and buds for a distance of 1 to 2 inches, causing die back equal to the length of the wound. The primary damage consists of dead terminals and a decided growth check. Secondary injury results from weakened tree vitality and susceptibility to drought and attack on the main stem by Ips and other Scolytid beetles, causing the death of affected trees. The nut crops have already been greatly reduced on this area which will further increase with the death of additional terminals. Practically all the trees on the infested area have been attacked. The average injury throughout is estimated to be 40% in loss of tips. Barkbeetles have already invaded the area and many trees have died from their attacks. Unfortunately no methods of control are known that are applicable under normal forest conditions.

GREAT BASIN TENT CATERPILLAR INFESTATIONS

During the past year the Great Basin Tent Caterpillar, Malacosoma fragilis, developed widespread infestations throughout the Great Basin region; extending its depredations from the southern limits of the Mojave Desert north to Honey Lake, and from the east slopes of the Sierras well

into Nevada. Several epidemic centers developed simultaneously on the open ranges of both the Inyo and Mono forests. (These areas are shown in "B" on the maps in appendix.) The principal host involved in these infestations is bitter brush, Purshia tridentata, although aspen, desert peach, and willow are taken.

This insect priodically defoliates range browse and has staged several spectacular outbreaks on the Inyo-Mono ranges during the past 20 years. An incipient infestation developed in 1937 but did not make progress in 1938 so it was believed last year that that infestation cycle was waning. However, the infestation that developed in 1939 was highly epidemic and aggressive over several areas aggregating 75,000 acres.

Since severe defoliations result in the death of the host, thereby greatly impairing stock ranges, the insect is of considerable economic importance. As yet no practical means of control have been developed. Field work during the past season was directed toward a survey of its range and the location of the epidemic centers. A check plot was laid out in an epidemic area near the Benton Crossing in Long Valley to test the efficacy of an ovicidal spray which was applied to all infested bushes on the plot. This spray, an atomizing oil solution containing nicotine and atomized oil in aqueous suspension, was aimed at killing the unhatched larvae, the development stage of the brood during the fall period. The results of this spray application cannot be fully determined until the spring of 1940.

RECOMMENDATIONS

Control by direct methods is not recommended at this time for any current infestations in these forests. Barkbeetle infestations in the Jeffrey pine and lodgepole pine stands are at such a low ebb that further reduction by such measures is not feasible.

Methods for the control of the Great Basin Tent Caterpillar, the lodgepole pine needleminer, the aspen leaf roller, and the pine tip moth have not yet been developed to the stage where they can be recommended for general use.

Surveys should be continued to determine the progress of current infestations and their results. Established check plots should be surveyed annually. Additional check plots should be established in the lodgepole pine needleminer infested area and in the pine tip moth areas for further study of these infestations.

Methods for the control of the Great Basin Tent Caterpillar and the aspen leaf roller should be further investigated and lethal sprays should be tested on suitable sample areas.

SUMMARY

A survey of forest and range insect conditions on the Inyo and Mono National Forests was made during the field season of 1939 by the Bureau of Entomology and Plant Quarantine.

The survey was of the reconnaissance type supplemented by intensive examinations of special areas and by plot cruises. All the principal timbered areas and main stock ranges were covered.

Barkbeetle infestations in the coniferous forests were generally subnormal during the year. Losses in the Jeffrey pine forests were the lowest recorded in the last 15 years. Control work was successful in eliminating a persistent infestation in lodgepole pine on the Mammoth Lakes recreational areas. No further control work is recommended here.

Insect conditions in the broadleaf species remained about the same as formerly. Control is not feasible under present forest conditions.

The fir tussock moth has not reappeared since its subsidence in 1937. Trees weakened by its attacks continue to die from previous defoliations and from attacks by secondary insects. Further results are to be studied.

A new needleminer developed an aggressive infestation in lodgepole pine in the Mono Craters region. This infestation has already spread over an area of 11,000 acres. Continued observations on its progress are planned.

The pinon pine needleminer which had been active for the past ten years in the Casa Diablo area largely disappeared during the year. A large section of the infested area was reduced to a ghost forest during the period of its greatest activity.

The aspen leaf roller continued its depredations on several of the most popular recreational areas. Methods for its control should be investigated and developed.

The pine tip moth infestation was continued in the nut pine forests near Topaz Lake. Secondary insects are invading these weakened stands with lethal results.

The Great Basin tent Caterpillar developed epidemic infestations on several large areas in the open range regions, attacking the principal browse species, bitter brush. This species is of sufficient economic importance on stock ranges to warrant developement of special control methods. Tests of a special spray formula were made in one check area.

R. 26 E. R. 27 E. R. 28 E. R. 29 E. R. 30 E. R. 31 E. R. 32 E. R. 33 E.

T 2 N

T. 1 N

T. 1 S.

T. 2 S.

T. 3 S.

T. 4 S.

MONO - INYO NATIONAL FORESTS

LEGEND

- A — Tussock Moth
- B — Great Basin Tent Caterpillar
- C — Pinon Pine Needleminer
- D — Lodgepole Pine Needleminer
- E — Aspen Leaf Roller
- F — Pine Tip Moth
- Barkbeetle Survey Plots

MONO CRATERS PLOT

MAMMOTH PLOT

MONO N.F.

INDIAN VOLCANIC

PAIUTE

NEVADA CALIFORNIA

MONO – INYO NATIONAL FORESTS

LEGEND

- Tussock Moth
- (B) Great Basin Tent Caterpillar
- (C) Pinon Pine Needleminer
- (p) Lodgepole pine Needleminer
- Aspen Leaf Roller
- Pine Tip Moth
- Barkbeetle Survey Plots

MONO – INYO NATIONAL FORESTS

LEGEND

- A — TUSSOCK MOTH
- B — GREAT BASIN TENT CATERPILLAR
- C — PINON PINE NEEDLEMINER
- D — LODGEPOLE PINE NEEDLEMINER
- E — ASPEN LEAF ROLLER
- F — PINE TIP MOTH
- . — BARKBEETLE SURVEY PLOTS

LEAVITT MEADOW PLOT

HELL GATE PLOT

Copies to —
Cranghead
R. S. — 3